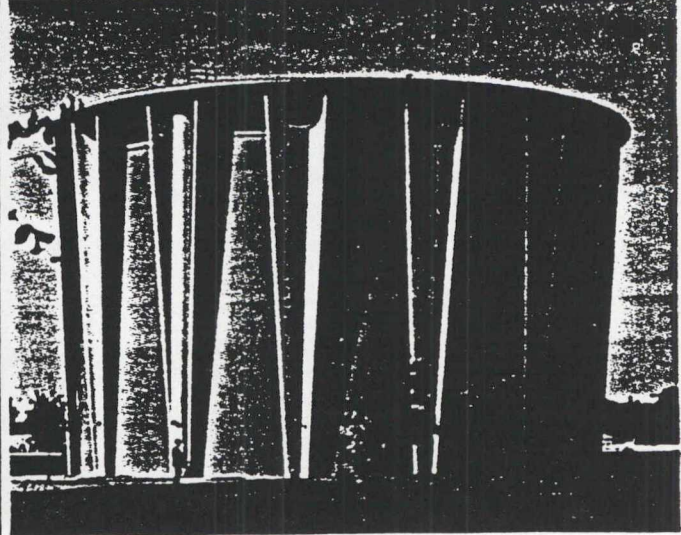
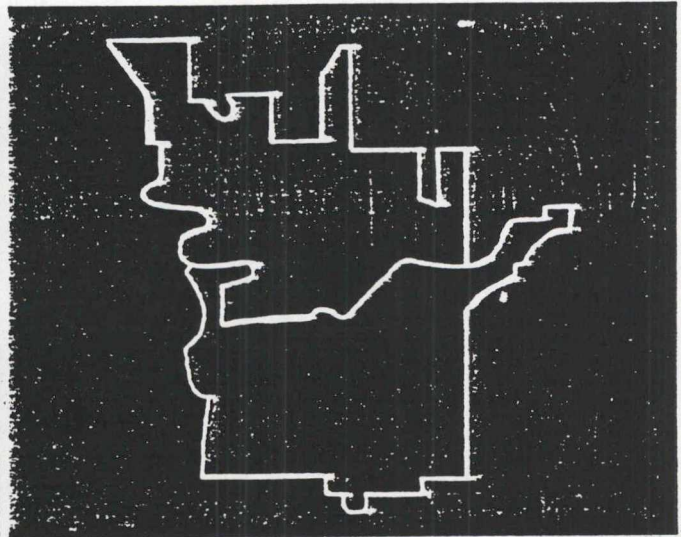
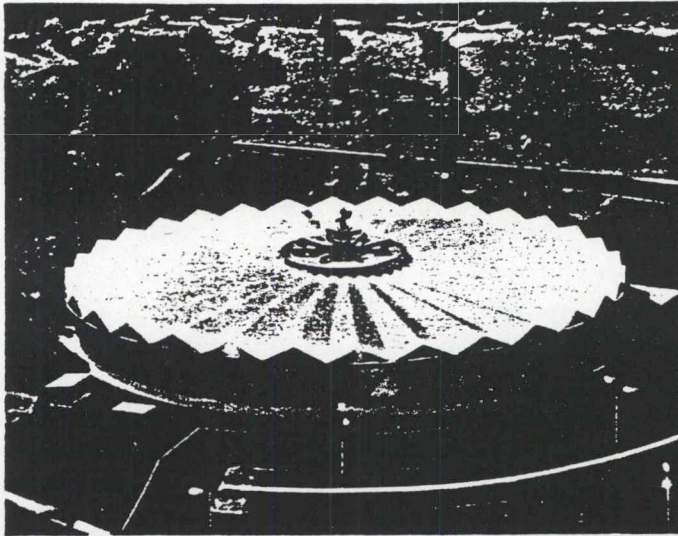


Ket. 112  
SF

# SPOKANE WATER

THE BEST IN THE WEST

EST MAY 1965



DEPARTMENT OF PUBLIC UTILITIES

WATER DIVISION — CITY OF SPOKANE

GLEN A. YAKE, ASSISTANT CITY MANAGER-ENGINEERING

DP 1.2

USEPA SF



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## SPOKANE'S UNDERGROUND STREAM

A virtual river of ground water streams through the glacial-till (soils transported by glacial action) which underlies most of Spokane Valley. The underground river extends eastward beneath the Spokane Valley and Rathdrum Prairies and thence northward under Eight Mile Prairie and Hoodoo Valley. These glacial deposits, dams, side valleys and old water courses form Pend Oreille, Coeur d'Alene, and several smaller lakes.

From the south end of Lake Pend Oreille, the great stream of ground water flows through this porous formation for fifty miles to Spokane, its water surface dropping 160 feet over this course. Data obtained during the past 30 years indicate the major source of this flow is seepage from Pend Oreille Lake. Percolation <sup>due to</sup> precipitation on the lowland plains above the flow, and <sup>on</sup> mountain slopes which

drain directly to these plains, add considerably to the flow, as does seepage from Coeur d'Alene Lake. Leakage from the smaller lakes is negligible in quantity.

The Spokane River flows over the surface of this water-bearing formation for thirty miles in a very tight bed which permits practically no seepage into the ground. Throughout a two-mile reach about six miles upstream from the City, the ground water discharges into the river from both banks. Similar springs of about the same extent are found within the City east of Greene Street. These two springs are the river's major tributaries during the dry summer months. Further evidence of the continuation of this underground stream is its appearance as springs in the Little Spokane River in the Waikiki vicinity.

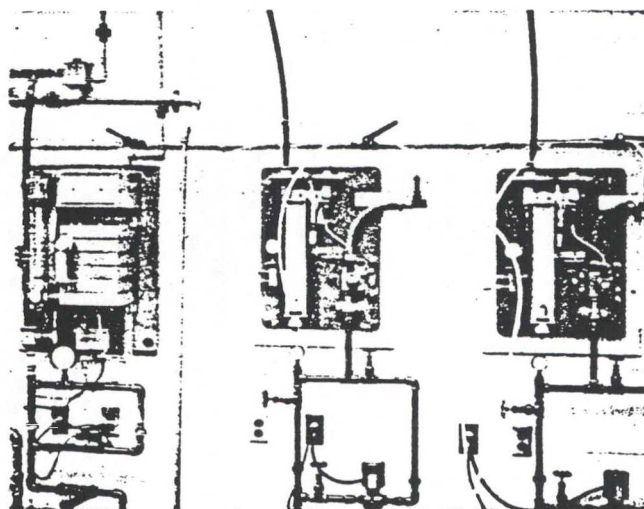
## CHEMICAL ANALYSIS OF WATER

	mg./l.
Calcium (Ca)	34.3
Magnesium (Mg)	17.4
Sodium (Na)	3.6
Carbonate (CO <sub>3</sub> )	0
Sulfate (SO <sub>4</sub> )	11.0
Chloride (Cl)	1.6
Silica (SiO <sub>2</sub> )	12.0
Alumina (Al)	0
Iron (Fe)	0
ABS	.01

\*Hardness as grains per U.S. Gallon—7.1  
 \*\*As Nitrate—3.5 mg/l

	mg./l.
Alkalinity, phenolphthalein (as CaCO <sub>3</sub> )	0
Alkalinity, methyl orange (as CaCO <sub>3</sub> )	144
Hardness* (as CaCO <sub>3</sub> )	122
Total Solids	141
Mineral Matter	77
Volatile Material	64
Dissolved Oxygen (O <sub>2</sub> )	7.7
Fluorine (F)	trace
Nitrate Nitrogen (NO <sub>3</sub> -N)**	0.8
Manganese (Mn)	0
pH	7.8

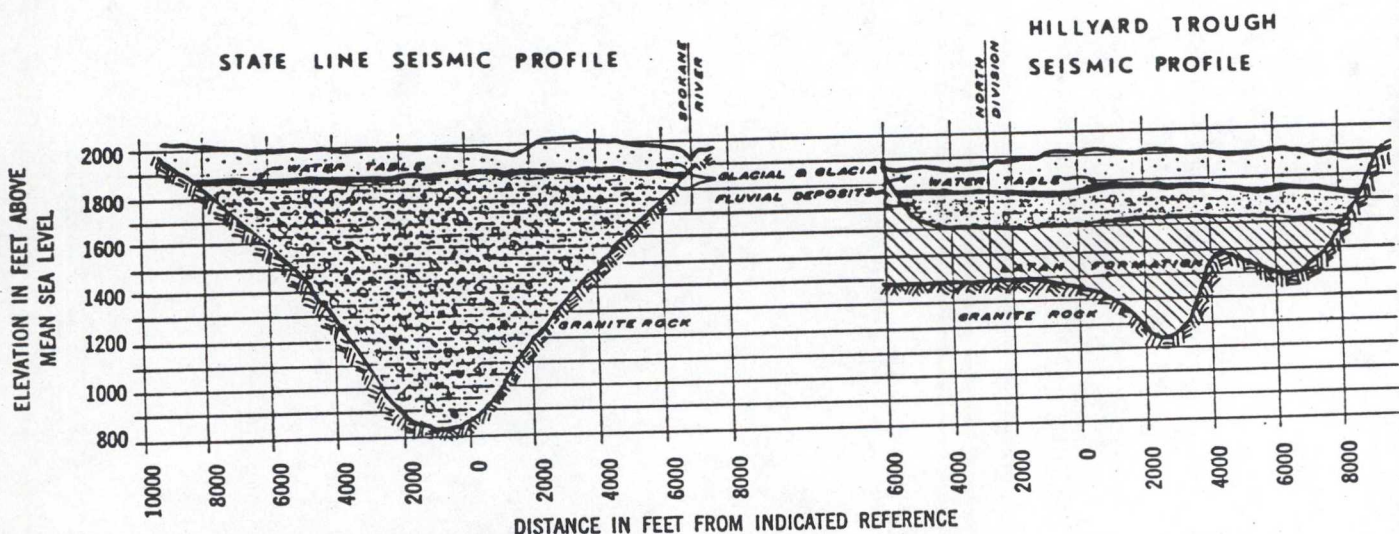
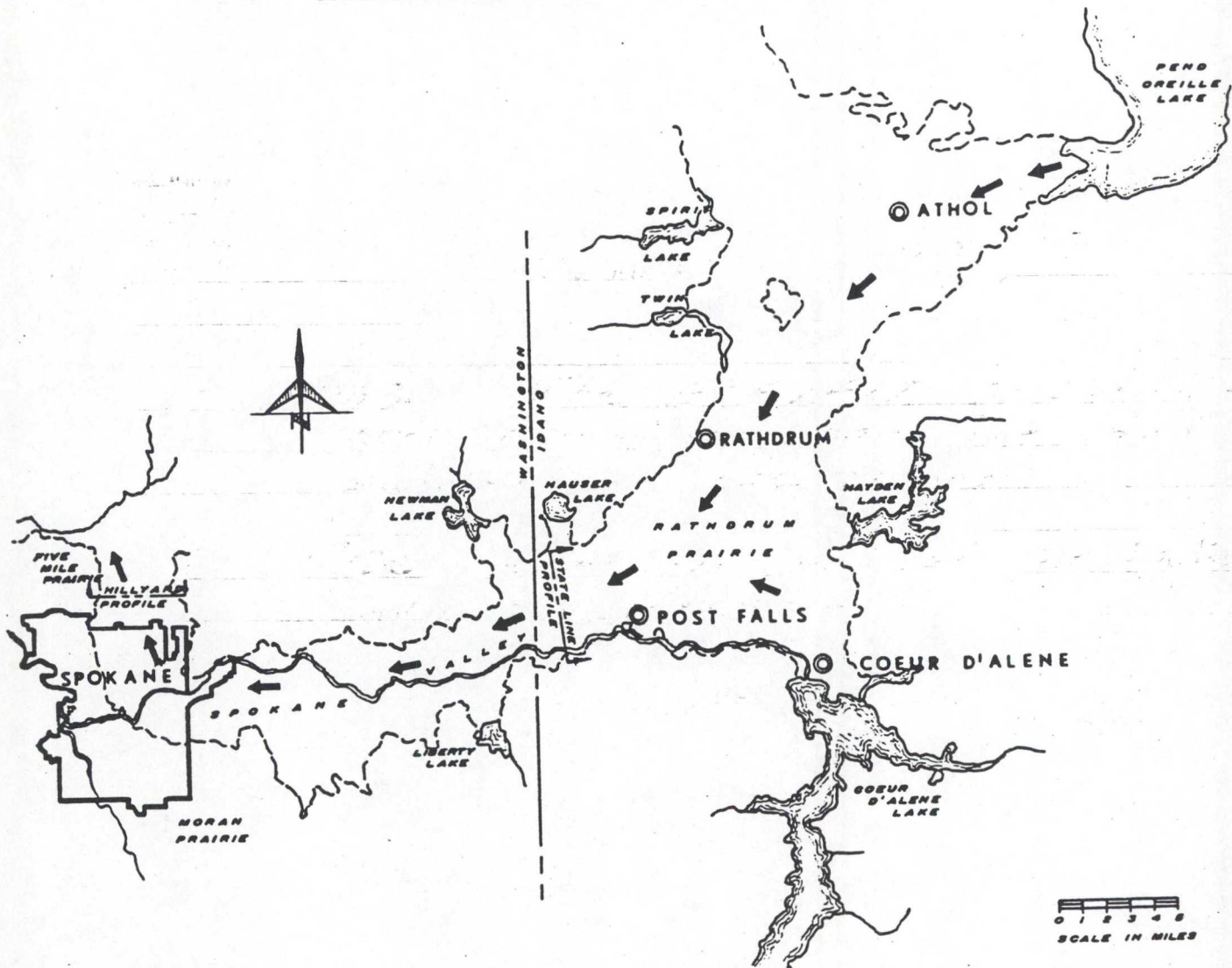
As the underground waters enter the City, the stream has an estimated flow of about a half-billion gallons per day, which is sufficient to support approximately 1½ million people, with associated industries. The water obtained from wells of the Spokane water works has a temperature of 48 degrees, hardness of 130 to 144 parts per million, and an excellent taste. Although Spokane's water contains no harmful bacteria, as a precautionary measure, a little chlorine is added at the pumps so that every 5000 tons of water entering the distribution system contain a pound of chlorine. Wells sunk into the underground stream yield large quantities of water with little draw-down.



Pump Station Chlorinators



# DIRECTION OF UNDERGROUND WATER FLOW — SPOKANE VALLEY



SOURCE: "ESVELT & SAXTON" CONSULTING ENGINEERS

SEISMIC PROFILE DATA IS FROM "SEISMIC CROSS SECTIONS ACROSS THE SPOKANE RIVER VALLEY AND THE HILLYARD TROUGH, IDAHO AND WASHINGTON" BY R. C. NEWCOMB AND OTHERS. (U.S.G.S.)

CITY PLAN COMMISSION

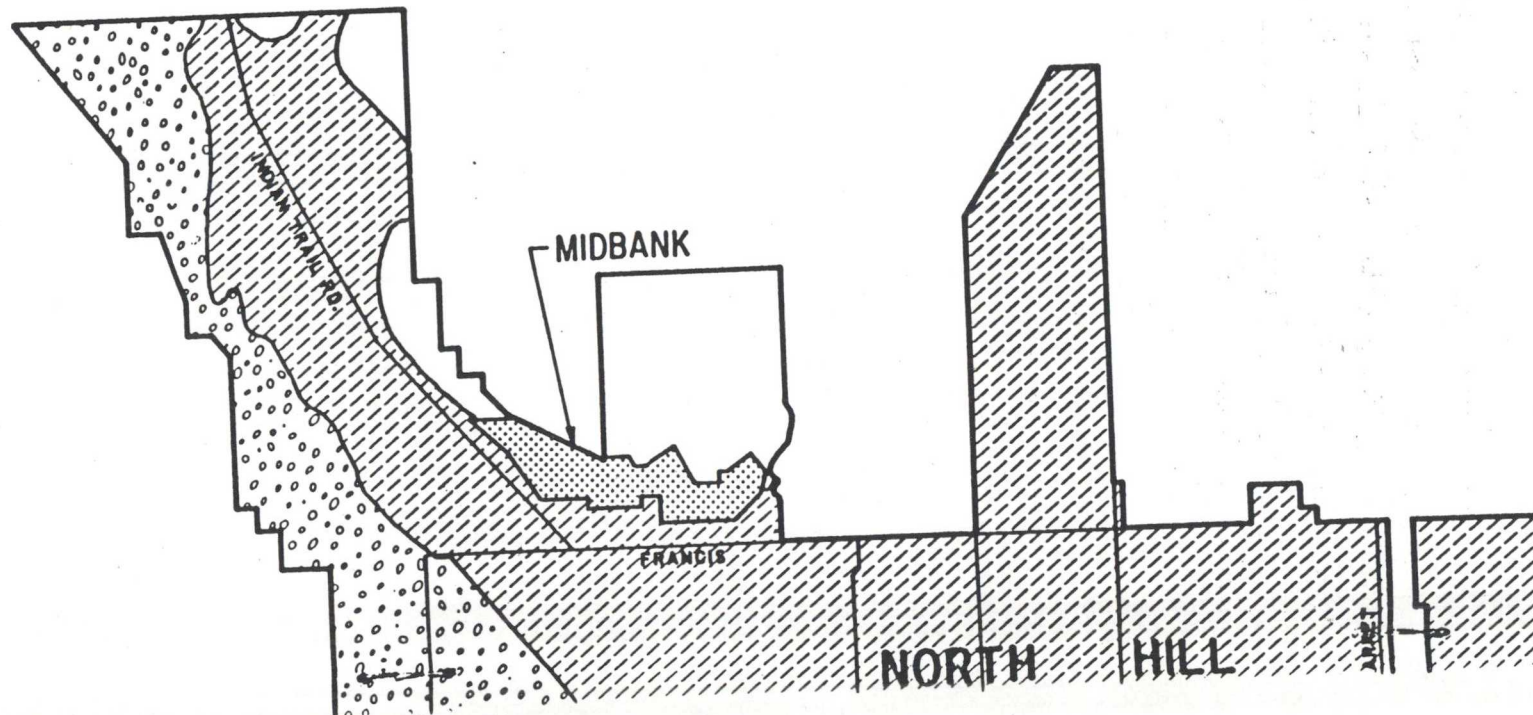
**SPOKANE, WASHINGTON**

MAY, 1965

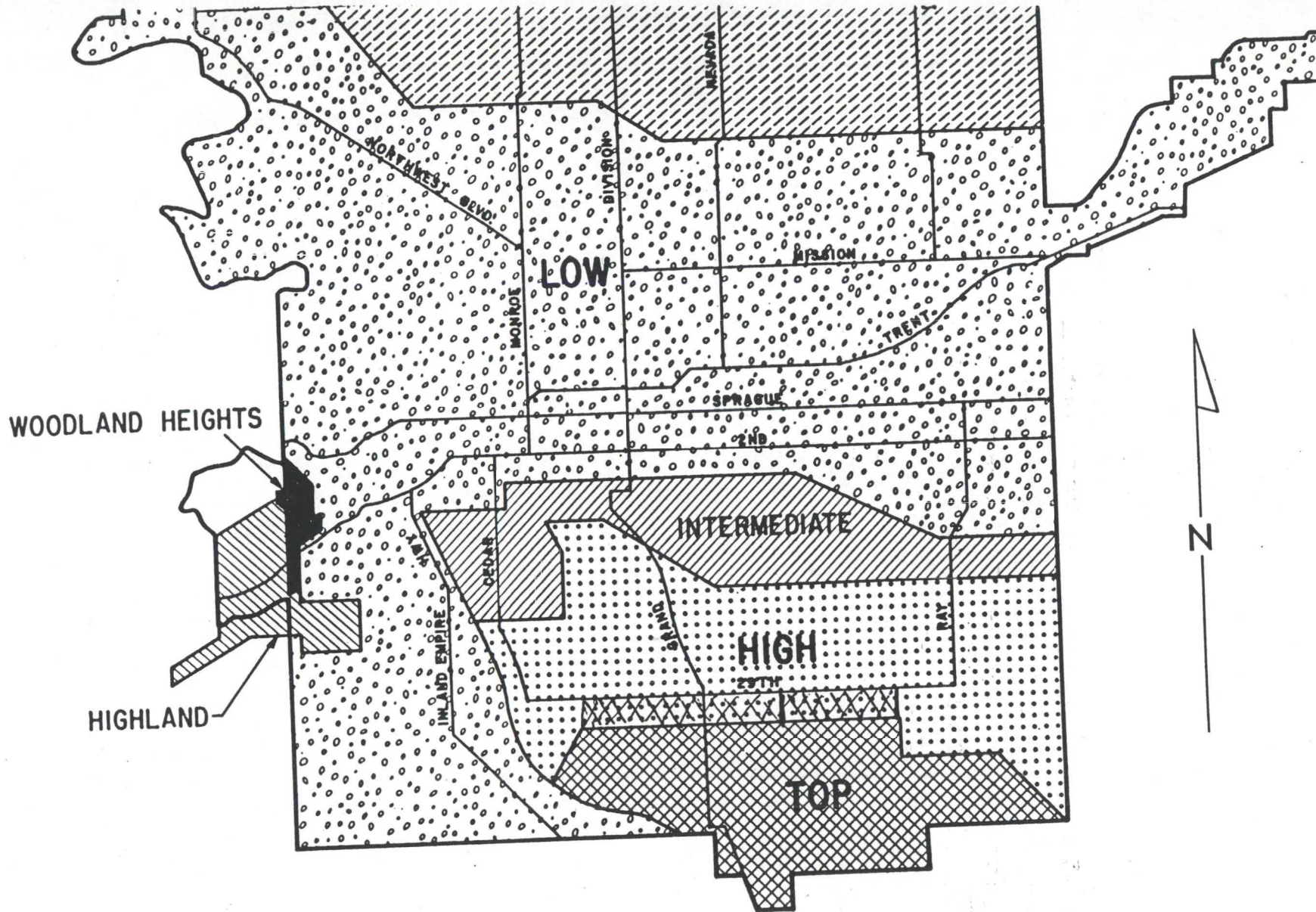
Spokane's rugged terrain necessitates the division of its water works into nine separate water systems, each consisting of its own pumps, reservoirs and distribution mains. If an attempt were made to serve the entire city, the pressure at the service at the lowest altitude would be more than 300 pounds per square inch.

The so-called Low System and North Hill System are supplied solely by pumpage from wells. The High, Top, Midbank, Highland, Woodland Heights and Geiger Heights Systems are supplied entirely by booster pumps, and the Intermediate System is supplied by a combination of both means.

In 1960, the High System was divided into two systems—the High and the Top Systems. This new system serves areas of Glenrose and Moran Prairies in addition to major locations within the City that require increased pressure and fire protection. Recently-annexed areas in the Northwest Spokane area have increased City acreage by some 1100 acres. A portion of the Five Mile Prairie area is within this newly-annexed property and will require a separate water system, as well as will some of the other adjacent areas because of their location and elevation.







as of 1983  
14 systems